

PERMO-TRIASSIC BOUNDARY COSMIC SPHERULE LAYERS IN EURASIA. Sh. Miono, *Osaka City University, Faculty of Sciences, Osaka 558, Sugimoto, Sumiyoshi-ku, Japan*, Cs. H. Detre, *Geological Institute of Hungary, Budapest, Stefánia ut 14. H-1143, Hungary*, Sz. Bérczi, *L. Eotvos University, Dept. of Petrology and Geochemistry, H-1088 Rákóczi ut 5., Budapest, Hungary*, Gy. Don, *L. Dosztály, P. Solt, Geological Institute of Hungary, Budapest, Stefánia ut 14. H-1143, Hungary*, I. Tóth, *Konkaly Observatory, P.O. Box 67, H-1525 Budapest, Hungary (tothi@ogyalla.konkaly.hu)*, I. Uzonyi, *Institute for Nuclear Research ATOMKI, Debrecen P.O. Box 51, H-4001, Hungary*, B. Lukács, *Research Institute for Nuclear and Particle Physics, KFKI, P.O. Box 49, H-1525 Budapest, Hungary*.

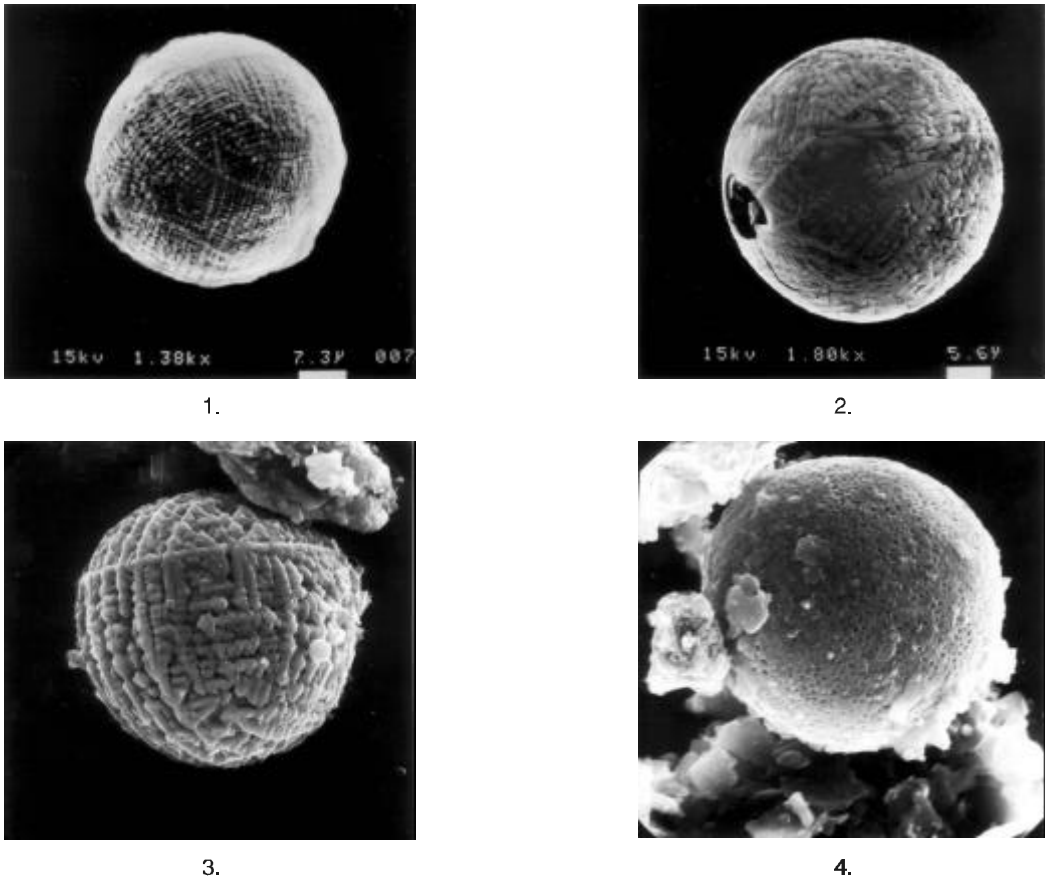
Introduction: There is universal agreement that the greatest extinction at both the genus and family levels occurred near the end of Permian period is the Permo-Triassic (P/Tr) extinction [1–4]. The major mass extinctions of taxa both on continents and in Permian oceans were taken place during the greatest extinction level of the geologic history of Earth. This extinction marked the change from Paleozoic to Mesozoic life. The analysis of microspherules found in geologic samples is a unique tool to study of geologic or possible cosmic events during the geologic horizon in question. The *spherule stratigraphy* could be useful method to study the past history Solar System in finer temporal resolution as it was suggested by [5]. The microspherules in Japan, China and Hungary P/Tr samples were analysed applying PIXE method have shown that their chemical composition show that they origin is interstellar [5–8]. We present here geostratigraphic sections around the P/Tr boundary studied in various sampling sites in Eurasia.

Spherule horizons of the P/Tr boundary: In the last years on the Eurasian continent several cosmic spherule layers were discovered near to the Permo-Triassic boundary. The spherules were investigated in different details on the following occurrence areas as follows: Sasayama, Tanba Belt (Japan) [6–8]; South China, Guizhou province (China) [8,9]; Bükk Mts. (Hungary) [5]; and Carnic Alps (Austria) [10,11]. The Japanese and the Guizhou occurrences in South China on the basis of PIXE investigations of Miono are considered as interstellar spherules by the characteristic relative elemental concentrations of Ti/Fe, Cr/Fe, Mn/Fe, Co/Fe and Ni/Fe. The Permo-Triassic boundary in the two Japanese sections is argued biostratigraphically by Permian and Triassic Radiolaria. In Hungary this can be revealed from two Permo-Triassic sections of the Bükk Mts. (NE Hungary), i.e. the Bálvány and Gerennavár sections. Here the biostratigraphical arguments are the very rich Permian macrofauna (Brachiopoda, Gastropoda, Nautiloidea, Foraminifera). The Triassic part of the sections contain rare Conodonts and Foraminifera faunas. A very sharp spherule layer is discovered just at the boundary.

The PIXE analyses of the spherules produced very similar results to the Japanese and Guizhou occurrences. Furthermore, the Japanese and Hungarian spherules are similar in the size (cca. 10 micrometer in diameter). In the Bükk Mts. under the above mentioned P/Tr boundary spherule layers an older Uppermost Permian spherule layer also was found containing very similar spherules to the above mentioned ones (it is under investigation). The spherules which were published by [11] seem different type, their size are significantly greater (cca. 100 micrometer in diameter). These spherules were not investigated by analytical methods, however came from the best investigated Permo-Triassic section on the Globe [10]. On the basis of the Japanese and Hungarian investigations an interstellar cosmic event could be supposed. The Solar System during along the orbit around the centre of Milky Way traversed cosmic dust clouds [6,7]. About the origin of these clouds see [5,12]. A world-wide investigation of P/Tr boundary cosmic spherules is under the organization of IGCP 384 Project (Impact and Extraterrestrial Spherules: New Tools for Global Correlation). One panel of P/Tr sections of the figure enclosed here is based on the work by [13].

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Typical P/T boundary spherules
1.-2. in Japan
3.-4. in Hungary

Bükk Mts (HUNGARY) TII suite of Tanba Belt (JAPAN) Sasayama (JAPAN)

